

Recent development of CzechGeo/EPOS and what next

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MINISTERSTVO ŠKOLSTVÍ,
MLÁDEŽE A TĚLOVÝCHOVY



CzechGeo/EPOS - Distributed System of Permanent Observatory Measurements and Temporary Monitoring of Geophysical Fields

Established in 2009 by integration of the stations and networks of Czech research institutions and universities

National node of the Large European Research Infrastructure EPOS-ERIC – European Plate Observing System

The first national Consortium among the all EPOS countries

- Institute of Geophysics of the CAS (IG CAS) – Hosting Institution
- Masaryk University, Faculty of Sciences, Institute of Physics of the Earth (IPE MU)
- Charles University in Prague
 - Faculty of the Mathematics and Physics, Department of Geophysics (FMP CU)
 - Faculty of Science, Institute of Hydrogeology, Engineering Geology and Applied Geophysics (FS CU)
- Institute of Geonics of the CAS, Ostrava (IGN CAS)
- Institute of Rock Structure and Mechanics of the CAS, Praha (IRSM CAS)
- Research Institute of Geodesy, Topography and Cartography, Zdiby (RIGTC)
- Czech Geology Service, Prague (from 2015)

Sections of CzechGeo/EPOS

1. Section of Seismology

- 6 networks, over 70 stations
- pool of ~60 mobile stations
- Near Fault Observatory built in West Bohemia
- Seismological Software Centre

2. Section of GNSS and Gravimetry

- 3 permanent networks, 50 stations
- epoch-style observations on 60 sites
- Gravimetric Observatory
- GOP Data, Analytic and Software Centre

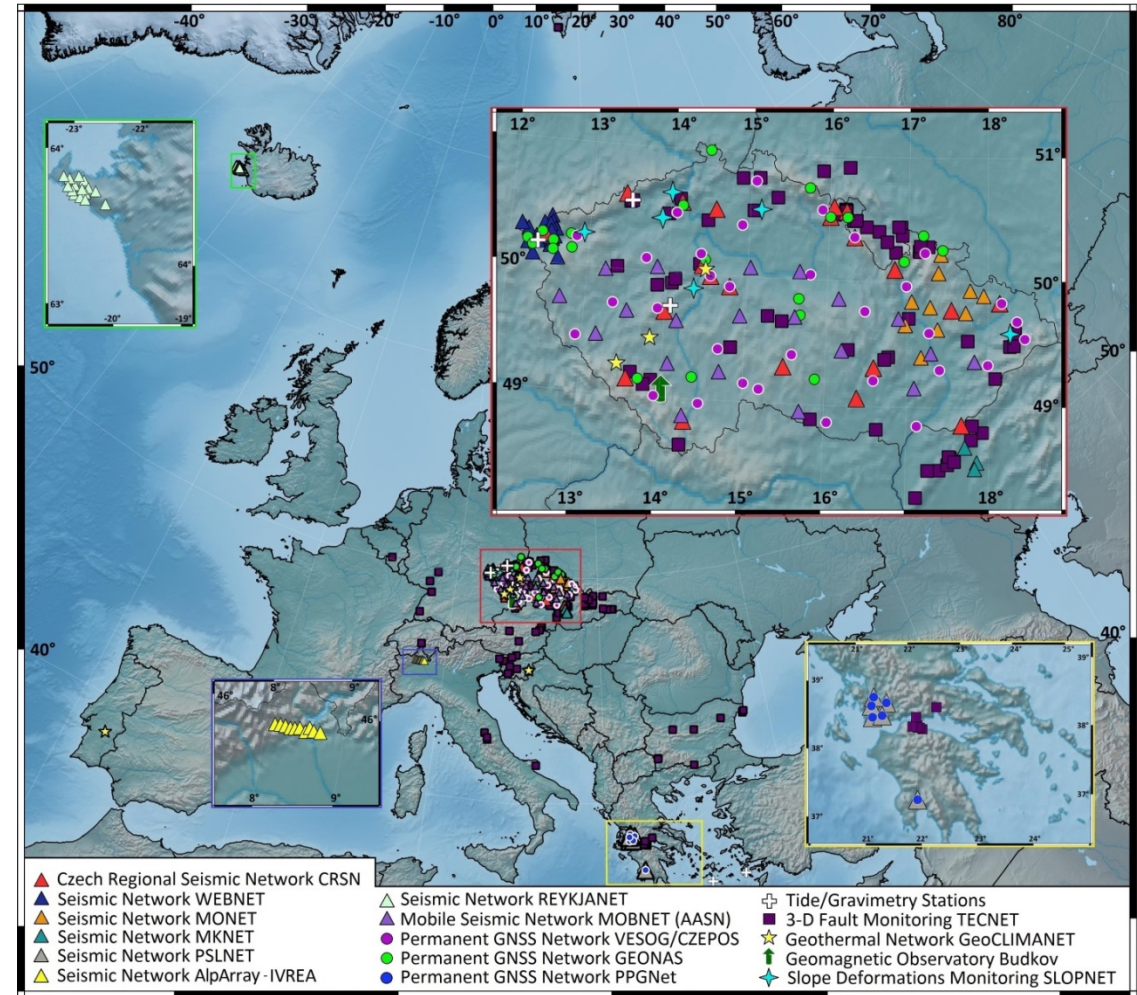
3. Section of Crust Geodynamics

- monitoring of fault displacement (160 sites), slope deformation (10 sites), temperature profile in boreholes (5 sites)
- Earth tide observatories

4. Section of Geomagnetism

- Geomagnetic Observatory
- geomagnetic and magnetotelluric mobile sets

5. Section of geological and geophysical databases



Projects to support the infrastructure

2010 – 2015, LM2010008, CzechGeo/EPOS, MEYS (state budget)

- investments to support modernization of the infrastructure, 20 M CZK
- non-investments to support technical development (including methods of data processing) and operation of the infrastructure, 100 M CZK
- no support of geoscience research activities

2016 – 2019, LM2015079, CzechGeo/EPOS, MEYS (state budget)

- non-investments to support technical development (including methods of data processing) and operation of the infrastructure, 96 M CZK
- no support of geoscience research activities

April 2017 – June 2020, CZ.02.1.01/0.0/0.0/16_013/0001800, CzechGeo/EPOS-Sci, OP Research, Development and Education

Key activities

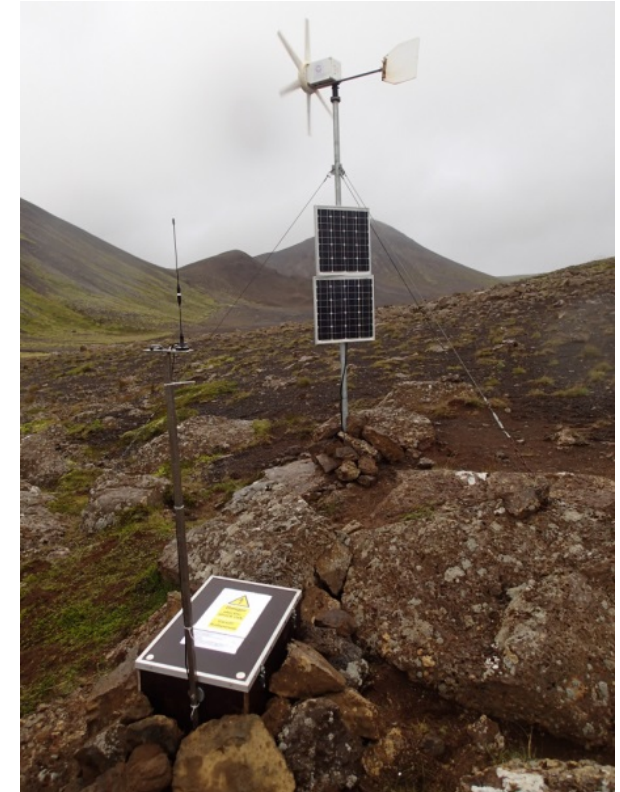
1. Project management, 4.2 M CZK (including overhead)
2. Modernization of observatory infrastructure – investments, 42.8 M CZK
3. Performance of geoscience research programs, 17.2 M CZK

CzechGeo/EPOS-Sci – Modernization

	Research Program	Key Equipment
1	Investigation of intraplate seismicity on the territory of the Czech Republic and in close surroundings (SEIS)	20 seismometers and seismic data acquisition systems 9 microwave telemetry for the seismic data transmission 5 borehole seismometers and seismic data acquisition systems 5 accelerometers; mass spectrometer
2	Structure of continental lithosphere and mapping LAB boundary in a broader surroundings of the Alps (DeepAlps)	11 seismometers 15 seismic data acquisition systems
3	Development of infrastructure in the field of GNSS, gravimetry and Earth tides (GNSSgrav)	8 GNSS receivers of all recent navigation systems 3 distributors 1PPS, 10MHz, 100MHz signals gravimeter Scintrex; inclinometer
4	Geodynamics	22 automated 3D extenzometers TM 71 multiparametric system in borehole; geoelectric monitoring system
5	Geological and Geophysical Data Infrastructure to Support Research	high-speed scanner upgrade of Zoner Photo Depository and Zoner Photo Studio server for virtualization; server for electronic communication

Results according to the Central Project Register (CEP)

Code		LM2010008 2010 - 2015	LM2015079 2016 - 2019
J	Reviewed paper in journal	119	51
D	Paper in Proceedings	11	6
N	Certified methodology	3	
R	Certified software		3
M	Organization of conference	3	
W	Organization of workshop	2	7
O	Other (published comprehensive data collections)	2	21



Service to the research community – external portals

Networks	Web address
CRSN, MONET, MOBNET seismic networks	https://www.orfeus-eu.org/data/eida/
CRSN, MONET	http://geofon.gfz-potsdam.de/waveform/archive/network.php?ncode=
Bulletins of seismic events - CRSN	http://www.isc.ac.uk/cgi-bin/collect?Reporter=IPEC
GNSS VESOG Network	https://webigs.ign.fr/gdc/en/data/search
GNSS VESOG Network – selected stations	https://igs.bkg.bund.de/dataandproducts/rinexsearch
GNSS PPGNet Network	http://www.gein.noa.gr/en/
Gravimetric Laboratory Pecný	http://isdc.gfz-potsdam.de/igets-data-base/
Absolute gravimeter measurements, Pecný	http://agrav.bkg.bund.de/agrav-meta/
Geomagnetic Observatory Budkov	http://www.intermagnet.org
Data Research Infrastructure of CGS	http://inspire-geoportal.ec.europa.eu/
Data Research Infrastructure of CGS	http://www.europe-geology.eu

Access to data

Open: CRSN, GEOMAG, Seismological Software Centre (registration), CARBONET, VESOG GNSS (not all stations), GOP data, Gravimetric station Pecný, CGS-DRI-partly

Open on request: PSLNET, PPGNet, WEBNET (location of seismic events and live seismograms available on-line), MONET, NFOWEB, CZET Skalná, GeoCLIMANET, TECNET, MKNET, SLOPENET, CGS-DRI-partly

Embargoed for a limited time: REYKJANET, MOBNET, CZET Jezeří (funded by a commercial partner), *CZEPOS*, CGS-DRI-partly.

Data providers or data centre operators may apply regulations for commercial use of data.

Service to the research community

National impact

- CzechGeo/EPOS integrates nearly all observational activities related to the solid Earth carried out by the Czech geoscience research and educational institutions.
- It is thus indispensable for any geoscience research on the territory of the Czech Republic
- used in numerous research papers
- used in applications
- frequently used in Master and PhD theses
- students are also involved in data acquisition and processing

International overlap

- international cooperation in operation of several networks (PSLNET, PPGNet – Greece, Reykjanet – Iceland, TECNET – stations in 15 countries)
- participation in large international research projects (recently AlpArray)
- participation in EPOS (CzechGeo/EPOS was the first national consortium among EPOS countries established in 2010)
- contributing to global and regional data centres
- used in numerous research papers

Service to the public – societal impact

- data from seismology monitoring are closely linked to seismic hazard at nuclear power plants and nuclear waste repositories
- data from TecNet are used for identification of stable environment for radioactive waste deposit
- SLOPENET network contribute to the security of infrastructures in the areas exposed to slope deformation
- CZET monitors slope stability around deep open pit mine
- WEBNET is cooperating with the company responsible for safety of water dams and reservoirs as well as with local authorities in case of intensive seismic swarms.
- seismic records of station VRAC are provided to International Data Centre of the Comprehensive Nuclear-Test-BAN Treaty Organization - IDC CTBTO in Vienna as a part of the international monitoring of nuclear tests
- daily forecasts of geomagnetic activity are submitted to Czech TV
- cooperation with the Czech Army on the seismic and geomagnetic observations
- monitoring of CO₂ degassing on mofettes represents a complementary network to the monitoring of discharge of mineral water in spa resorts of West Bohemia

Evaluation 2017

Criteria

presented by Lukáš Levák,
Director of the
Department of Research
and Development, MEYS,
*Day of National Research
Infrastructures 2017*

CzechGeo/EPOS meets
these criteria

Excellence measured by
“value for money” is a
problem



● Uniqueness

- Large research infrastructure represents an exceptional and unique facility gathering critical mass of technological devices and knowledge expertise necessary for performing world-class research, technology development and innovation

● Open access

- Large research infrastructure is operated by a research organisation for the use of other entities from the research community and provides external users with services on basis of tenders evaluated by experts

● Excellence

- R&D results reached by using the large research infrastructure respond to socio-economic challenges and are of high-quality and highly relevant from the “value for money” point of view

● National impact

- Large research infrastructure has at least national importance, significance and impact within the Czech Republic

● International overlap

- Large research infrastructure is inter-linked with other research infrastructures within macro-regional, pan-European or global networks having significant international impact

Evaluation scale

The Excellence criterion corresponds to the Scale for 2017 evaluation. We passed the evaluation with grade 3.

- 2) The RI's quality and potential enables it to contribute to provision of services in the given sphere. However, the RI has only minor user community, limited importance and thus also **limited relevance for the future development of research and innovation environment of the Czech Republic.**
- 3) The RI's quality and potential enable good quality services to be provided in the given sphere. The RI shows significant usage possibilities and is relevant for the future development of research and innovation environment of the Czech Republic. **Nevertheless, the RI is not a crucial one for strengthening the competitiveness** (value for money) **of the Czech Republic.**
- 4) The RI shows very high quality and high potential, but doesn't reach the top-class standards of international excellence with respect to the uniqueness, originality, importance and impact on the user community. However, the RI is still highly relevant for the future development of research and innovation environment of the Czech Republic, **substantially contributing to strengthen the competitiveness of the Czech Republic.**
- 5) The RI is of excellent quality compared to the leading actors worldwide with respect to its uniqueness, originality, importance and impact on the user community. The RI is highly relevant for the future development of research and innovation environment of the Czech Republic as well as **inevitable for strengthening the competitiveness of the Czech Republic.**

Evaluation 2017

- The evaluation was organized by the Department of Research and Development, MEYS
- International evaluation committee was composed of the Chair and 6 Scientific Boards per 5 Members formed by foreign experts (including 1 Member from the Czech Republic)
- Consensus reports distributed in August 2017
- CzechGeo/EPOS was evaluated by the Environmental Sciences Board, the overall grade was 3
- At the Day of National Research Infrastructures 2017, it was notified that infrastructures with grade 5, 4 or 3 passed through the evaluation
- However, **Research, Development and Innovation Council** (chaired by the Prime-Minister Babiš) decided that only infrastructures graded 5 and 4 would be included into the revised Czech Road Map and supported financially.
- The Council makes reference to the Consensus report, however, **the report states that “the RI structure is well managed and seems to be very efficient. There is no question about the need of such an organisation. It should be supported with public funds. Financial means should be provided to continue to operate and to develop further”.**

What Next

Operation of the networks and stations with limited finances

- can be for some partners critical!
- finances from the OP RDE till July 2019

Preparation for the next evaluation in 2021

- new Partners Agreement on cooperation in operation and development of the RI CzechGeo/EPOS (recent agreements are related to the projects)
- new CzechGeo/EPOS web (developed by CGS team, the conception already discussed among partners)
- enhance coordination and cooperation

between networks inside the CzechGeo/EPOS Sections

- increase the percentage of data available on-line in a user friendly way
- increase the percentage of data sent to European or world data centres
- be more proactive towards private or commercial use of data
- participate in outreach activities – join activities organized by institution

We do not give it up!

Thank you